

Professional DVD Video Player

DVD-Video Player
ProDVD 175

Technical Manual

Document version v2.0



Applicable for players with firmware version:
V3.50.08/V3.50.09/V3.50.11

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INTRODUCTION

This is the technical documentation for the ProDVD 175 series of DVD-Video Players. This documentation is especially made to support development of sophisticated DVD-Video applications for this special player.

Please notice that this document is valid for ProDVD 175 players executed with firmware version: v3.50.08;v3.50.09;v3.50.11

If you have any questions about this document, please feel free to contact Asint International (info@asint-international.com).

Procedure to check the DVD 175 firmware version:

The firmware version of the ProDVD 175 player can easily be checked by switching on the ProDVD 175 player without a disc and then pushing the “setup” button on the remote. Then push the “Menu Down Cursor Movement button” on the remote (Yellow button with downwards arrow) till you reach the “Access Control” selection field. Then push the “Menu Right Cursor Movement Button” on the remote control to select the “Access Control” selection field. Then push the “Menu Down Cursor Movement Button” till you reach the “Help Text selection field. One extra click on the “Menu Down Cursor Movement button” of the remote (Yellow button with downwards arrow) and the content of the Help Text field will change in (C)‘00-’01 x.y.z. where x.y.z. stands for the firmware release version.

Example: (C) ‘00-’01 3.50.11 020708 P107 5.1.14

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I/O PORT

The ProDVD 175 professional DVD player can also be controlled by an external controller or a pointing device. This can be done via the I/O port at the rear of the player. The connector type is a D-sub 9 male. One and the same interface is used for pointing devices as well as for external control.

- The pointing device protocol has an automatic pointing device protocol activated when the transmission speed is 1200 baud.
- The control via an external controller is activated when the transmission speed is 9600 baud.

Pointing device protocol

Communications signals follow the RS-232-C specifications. For details of this see the EIA RS-232-C standard.

- 1 start bit
- 7 data bits LSB first
- 2 stop bits
- Speed 1200 bauds

For pointing devices only two signal lines carry data. The first is RTS, which is always output from the player. The second is RXD, which is always input to the player.

Pinning input (sub-D9 male on the player):

| Pin | signal | I/O |
|-----|--------|-----------|
| 1 | | |
| 2 | RXD | I |
| 3 | TXD | O |
| 4 | +5V | max 200mA |
| 5 | GND | |
| 6 | | |
| 7 | RTS | O |
| 8 | CTS | I |
| 9 | | |

I = input signal for the Player

O = output signal from the Player

RATINGS:

+5V output from the player:

- accuracy: +5V 10%
- supply current: min 200mA

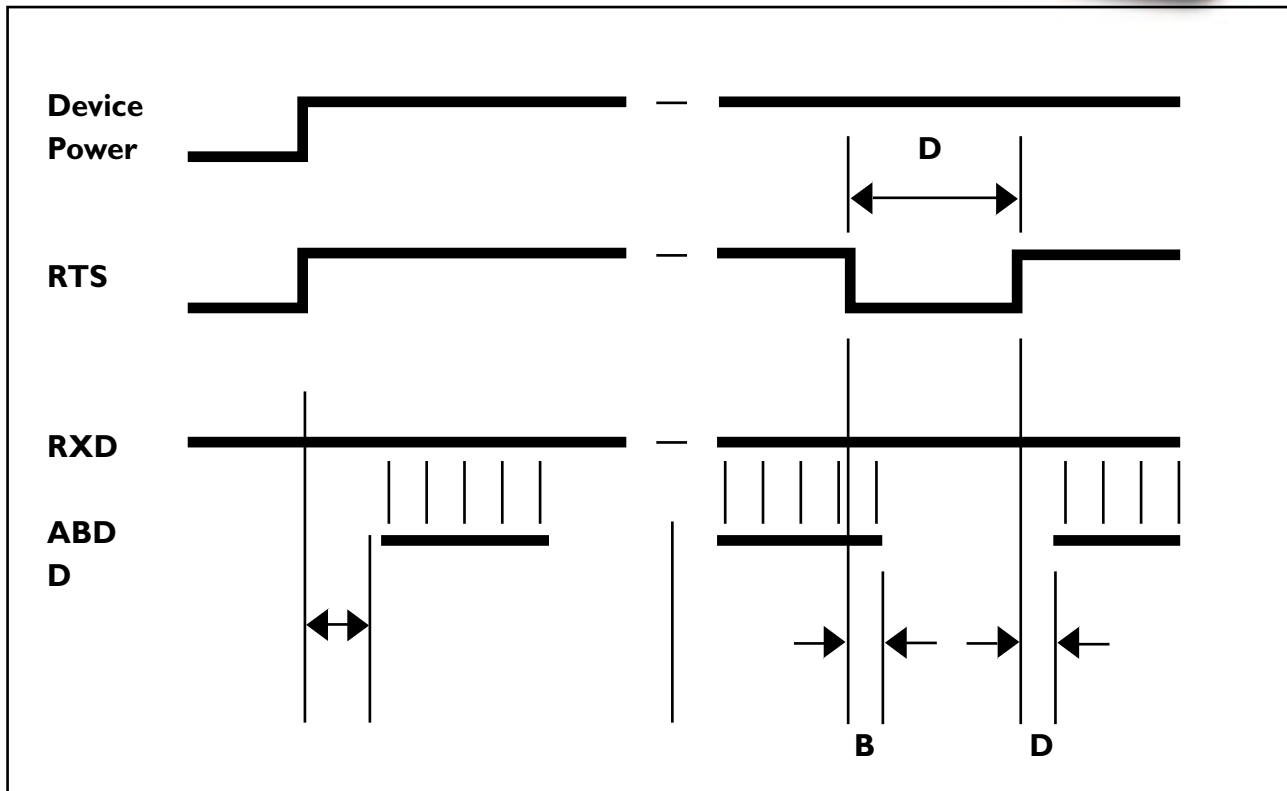
RXD /TXD

- logical 1: $-15V < \text{signal level} < +0.8V$
 - logical 0: $+2.4V < \text{signal level} < +15V$
- (Output impedance pointing device max 4.7kOhm)

RTS /CTS

- Off (Negated): $-15V < \text{signal level} < +0.8V$
- On (Asserted): $+2.4V < \text{signal level} < +15V$

This interface allows for pointing devices and accessories which are powered from the player using logic circuits operating on 5V only.



Device ID codes

| Device Type | d6--d0 | ASCII |
|-----------------|---------|-------|
| Relative | 1001101 | 'M' |
| Maneuvering | 1001010 | 'J' |
| Absolute | 1010100 | 'T' |
| Absolute Screen | 1010011 | 'S' |

Device identification pointing devices

Every pointing device is to transmit its type identification (ID) byte on request. This allows the player to identify the device type that is connected to it for maximum flexibility and ease of use.

Device ID sequence

- Negate RTS: Current data transmission to the player is stopped.
- Assert RTS.
- The device sends its 1-byte device ID.

Note: It is advisable to send a complete data packet after the identification byte to establish the state of the buttons.

Device ID timing

- A: device power-on to ID byte timing
 - Min. 100ms
 - Max. 500ms.
- B: negate RTS timing:
 - Min. 10ms
 - Max. irrelevant.
- C: Residual data transmission time when RTS is negated:
 - Min. 0 ms.
 - Max. 1 byte period (1200 baud = 8.3ms)
- D: Assert RTS to ID byte timing when device is powered:
 - Max. 10ms.

External controller protocol

The communication with an external ProDVD controller is done with the following settings:

- 8 data bits,
- 1 stop,
- no parity bit
- speed of 9600 Baud.

Communication between a ProDVD controller and the DVD player consist of 3 different types of information:

- External control commands
- External control status
- Asynchronous responses

The messages between the ProDVD and the ProDVD controller look like: “[group, command, parameterlist]\r”

A group, command and parameter-list between square-brackets, followed by a carriage-return character (\r).

The group and command are not case sensitive; there is no difference in the usage of uppercase and lowercase characters. The parameter-list exists of comma separated parameters, and are case sensitive.

When the player receives a message from the external controller, it will be acknowledged. This acknowledgment will be done in 2 different ways.

- For external control commands, the acknowledgment will look like:
 - group: group specified in the received message (PC)
 - command: command specified in the received message
 - parameter-list ReturnValue

ReturnValue can have one of the following values

- 0: No error
- x: Error code x

Example:

- player receives: [PC, RC, 66]\r
- player sends: [PC, RC, 0]\r

When the external controller receives the response this implies that the player has verified the received message (syntax), and the command will be executed (It does not imply that the command is executed without errors).

- For external control status messages there is specified a response message on a request. The response is the acknowledgment of the request.

Example:

- Request: [PS, GetAudioStream]\r
- Response: [PS, GetAudioStream, 0, 2]\r

When the external controller receives the response, the player has executed the command.

- When an external control command causes an error, an asynchronous error message will be send to the external controller.

Example:

- Player receives: [PC, RC, 44]\r
- Player sends: [PC, RC, 0]\r
- Player sends: [PR, Error, 10]\r

When the external controller receives the response, the player has verified the message (syntax), and when no errors occurred, the command will be executed.

If an internal error occurs and the command can not be executed, an error message will be send.

- When the command does not cause an error, but execution of this command changes the state of the player, this status change will be send to the external controller. Also other asynchronous responses, e.g. start of chapter, can be expected.

Example:

- Player receives: [PC, RC, 44]\r
- Player sends: [PC, RC, 0]\r
- Player sends: [PR, StatusChange, 4]\r
- Player sends: [PR, SOC, 2]\r

RELATIVE COORDINATE AND MANEUVERING DEVICES

Relative Coordinate devices e.g. Mice, Trackballs and Maneuvering devices e.g. Joysticks and joypads

Data Flow

During normal operation (RTS asserted):

- Data is sent to the player via RXD.
- Every time the device is moved or button state is changed, 3-byte data packets should be transmitted to the player.
- No data should be transmitted when the device is stationary (in center position) and the button state is unchanged (pressed or released).
- A button state change or device position change should not interrupt a data packet transmission.
- To allow for additional buttons on the pointing device, one additional byte (with d6 = 0) may be added to the data package. Systems specified to work with the specific device will react to this byte; other systems will ignore it.

bt 1 = button 1: 1 = pressed
 0 = not pressed

bt 2 = button 2: 1 = pressed
 0 = not pressed

X7..XO: 8-bit data horizontal movement. 2's complement.
 left direction = negative (\$FF..\$80)
 right direction = positive (\$01 ..\$7F)

Y7..YO: 8-bit data vertical movement.

| | d6 | d5 | d4 | d3 | d2 | d1 | d0 |
|----------------------|----|-----|-----|----|----|----|----|
| Byte 0 | 1 | bt1 | bt2 | Y7 | Y6 | X7 | X6 |
| Byte 1 | 0 | X5 | X4 | X3 | X2 | X1 | X0 |
| Byte 2 | 0 | Y5 | Y4 | Y3 | Y2 | Y1 | Y0 |
| Byte 3 (optional) | 0 | | | | | | |

2's complement. up direction = negative (\$FF..\$80) down direction = positive (\$01..\$7F) A value of \$00 for horizontal or vertical movement indicates no movement in that direction.

note: bt1 and bt2 will be implemented as OK button

ABSOLUTE SCREEN DEVICES AND ABSOLUTE COORDINATE DEVICES

Absolute screen devices and absolute coordinate devices e.g. Touch Screens, Light Pens.

Data flow

During normal operation (RTS asserted):

- Data is sent to the player via RXD.
- Every time the pointing indicator is in motion in the active area or a button state is changed, 4-byte data packets should be transmitted to the player.
- No data should be transmitted when the pointing indicator is not in the active area and the button state is unchanged (pressed or released).
- A button state change or device position change should not interrupt a data packet transmission.
- To allow for additional buttons on the pointing device, one additional byte (with d6 = 0) may be added to the data package. Systems specified to work with the specific device will react to this byte; other systems will ignore it.

bt 1 = button 1: 1 = pressed
0 = not pressed

bt 2 = button 2: 1 = pressed
0 = not pressed

pd 0 = when screen is pressed
1 = when screen is released
followed by pd=0

| | d6 | d5 | d4 | d3 | d2 | d1 | d0 |
|----------------------|----|-------------------------|-----|----|----|----|----|
| Byte 0 | 1 | bt1 | bt2 | X9 | X8 | X7 | X6 |
| Byte 1 | 0 | pd | 0 | Y9 | Y8 | Y7 | Y6 |
| Byte 2 | 0 | X5 | X4 | X3 | X2 | X1 | X0 |
| Byte 3 | 0 | Y5 | Y4 | Y3 | Y2 | Y1 | Y0 |
| Byte 4 (optional) | 0 | not supported in DVD175 | | | | | |

X9..X0: 10-bit absolute horizontal position. Outermost left position \$000.
Outermost right position \$3FF

Y9..Y0: 10-bit absolute vertical position. Outermost upper position \$000.
Outermost

Note: bt1 and bt2 are not supported in the DVD175

ADDITIONAL BYTES POINTING DEVICES

| Key | Value |
|----------------|-------|
| Keys released | \$00 |
| Menu | \$10 |
| Stand-by | \$11 |
| Mute on/off | \$12 |
| Help | \$1C |
| Player/TV | \$1D |
| Volume up | \$1E |
| Volume down | \$1F |
| Play | \$20 |
| Stop | \$21 |
| Pause | \$22 |
| next | \$23 |
| Previous | \$24 |
| Search forward | \$25 |
| Search reverse | \$26 |
| Repeat | \$27 |
| Next disc | \$28 |
| Previous disc | \$29 |
| Still forward | \$2A |
| Still reverse | \$2B |
| Slow forward | \$2C |
| Slow reverse | \$2D |
| Return | \$2E |
| Open/close | \$3B |
| #0 | \$30 |
| #1 | \$31 |
| #2 | \$32 |
| #3 | \$33 |
| #4 | \$34 |
| #5 | \$35 |
| #6 | \$36 |
| #7 | \$37 |
| #8 | \$38 |
| #9 | \$39 |
| Zoom | \$40 |
| Angle | \$41 |

EXTERNAL CONTROL COMMANDS

Remote control commands

group: PC
command: RC
parameter list: RCCode

RCCode: The RC6 code of the remote control signal to execute.

See Appendix for the list of supported RC commands

Example: [PC, RC, 66]\r

Player will react as if the the Open/Close button was pressed.

Play title

group: PC
command: PlayT
parameter list: TitleNumber

TitleNumber: Number of the title (DVD) or track (VCD or CDDA) to play

Example: [PC, PlayT, 3]\r

Player will start playing the first chapter of title 3 (in the case of a DVD disc). Player will start playing from the beginning of track 3 (in the case of a VCD or CDDA disc).

Note: The behaviour of the PlayT and PlayC commands are influenced by the SetPlayMode command.

Play chapter

group: PC
command: PlayC
parameter list: TitleNumber, ChapterNumber

TitleNumber: Number of the title (DVD) or track(VCD) to play

ChapterNumber: Number of the chapter (DVD) or entry (VCD) to start in the specified title or track.

Example: [PC, PlayC, 3, 2]\r

The player will start playing chapter 2 of title 3 (DVD) or entry 2 of track 3 (VCD).

Note 1: The behaviour of the PlayT and PlayC commands are influenced by the SetPlayMode command.

Note 2: When the player is in 'stop' or 'pause' mode, the player starts playing chapter 1 regardless of the chapter number that is being used.

Switch on/off OSD (On Screen Display)

By this command the player can be forced not to show OSD icons like for instance "pause" and "play" during the playback of a disc.

When the disc is stopped the normal OSD with title/chapter/track information remains displayed.

group: PC
command: OSD
parameter list: Mode

Mode can have one of the following values:

"OFF": OSD is switched OFF
"ON": OSD is switched ON

Example: [PC, OSD, ON]\r OSD is switched ON.

Note: The status of this feature remains unchanged after switching off and on the power of the player. (Stored in NVRAM).

Switch on/off LKC (Local Keyboard Control)

This command allows to switch on/off all the buttons of the keyboard at the front of the player.

group: PC
command: LKC
parameter list: Mode

Mode can have one of the following values:

“OFF”: Local keyboard is switched OFF

“ON”: Local keyboard is switched ON

Example: [PC, LKC, ON]\r Local keyboard is switched ON.

Note: The LKC mode will always be switched ON after starting up the player by switching on the power of the player.

Switch on/off RC (Remote Control)

This command allows to enable/disable the execution of RC commands received from the Remote Control.

group: PC
command: RCC
parameter list: Mode

Mode can have one of the following values:

“OFF”: RC is switched OFF

“ON”: RC is switched ON

Example: [PC, RCC, OFF]\r RC is switched OFF.

The DVD player will not react on a RC command.

Note 1: RC commands sent via RS232 are not affected by this command and therefore will be executed.

Note 2: The RC mode will always be switched ON after starting up the player by switching on the power of the player.

Note 3: When the RC is switched off, the DVD player will not react on a RC command

Note 4: When the RC is switched off, the RC eye still blinks after receiving a command

Note 5: When the RC is switched off, a cross is shown On OSD if an RC button is pressed. If OSD is switched off this cross is not shown.

Note 6: RCC lock status shall be stored in NVRAM. On start-up, RCC lock control is based on the value stored in NVRAM.

Note 7: The default for RCC lock is OFF, which means that RCC is not locked by default

Switch on/off UOPs

group: PC
command: UOP
parameter list: Mode

Mode can have one of the following values:

“OFF”: the check on UOPs is switched OFF

“ON”: the check on UOPs is switched ON

Example: [PC, UOP, OFF]\r
The DVD player will ignore the UOPs.

Warning: This feature can be dangerous especially with DVD disc not tested specifically for this non standard DVD feature. The system may crash. Use with care !

Set audio stream

This command allows to change the language version

group: PC
 command: SetAST
 parameter list: AudioStreamNumber

AudioStreamNumber: Number of the selected audio stream

Example: [PC, SetAST, 1]\r

The DVD player will change the audio stream to stream number 1.

Set sub-picture stream

group: PC
 command: SetSPST
 parameter list: SubPictureStreamNumber

SubPictureStreamNumber: Number of the selected sub-picture stream

Example: [PC, SetSPST, 4]\r

The DVD player will change the sub-picture stream to stream number 4.

CD-DA Lock

group: PC
 command: CDDALock
 parameter list: Lock

Lock can have one of the following values:
 "OFF": Lock is switched off.
 "ON": Lock is switched on.

Example: [PC, CDDALock, ON]\r

The DVD player will not play any CD-DA disc until the lock is switched off.

Note: The status of this feature remains unchanged after switching off and on the power of the player. (Stored in NVRAM)

Provider lock

group: PC
 command: PVRLock
 parameter list: Lock, ProviderID

Lock can have one of the following values:
 "OFF": Lock is switched off.
 "ON": Lock is switched on,

ProviderID: The identification of the provider. When Lock is "OFF", this parameter is ignored.

Example: [PC, PVRLock, ON, PRODVGPRM]\r

The DVD player will only play DVD discs from the specified publisher. This lock will be active from the next started disc onwards.

Important: The provider lock implies a CD-DA Lock.

Note 1: The provider ID will be searched in either the Publisher field "Primary volume descriptor of ISO9660" of the disc or the player will check whether there is an info.id file located on the disc. For more information about the info.id file, please check the available NVRAM manual.

Note 2: There is no interface function available to retrieve the actual set ProviderID the player is looking for when the provider lock is activated.

Note 3: The status of this feature remains unchanged after switching off and on the power of the player. (Stored in NVRAM)

Set play mode

group: PC
 command: SetPlayMode
 parameter list: PlayMode,

PlayMode is one of the following strings:

“CHAPTER”:

The disc will stop when a chapter is played.

“TITLE”:

The disc will stop when the last chapter of a title are played.

“DISC”:

The disc will start the next title when a title is played and stop after the last titles of the disc are played.

“OFF”

SetPlayMode is inactive.

Example: [PC, SetPlayMode,
CHAPTER]\r

The play mode is set to chapter play.

Note 1: The parameter list is case sensitive, thus the PlayMode must be in uppercase.

Note 2: The behaviour of this feature can be influenced by and combined with user settings like for instance “repeat disc” and “repeat chapter” given by the user through the remote control or the RS-232.

Note 3: The play mode status will be set to the standard setting after switching on the power of the player. (not stored in NVRAM)

Note 4: The default playmode is disc.

Time Search

| | |
|-----------------|-------------|
| Group: | PC |
| Command: | Time |
| Parameter list: | Time Search |

A typical EC command line for time search input may look like this:

Example: [PC, Time, 1,35,15]

The player is supposed to start playing at 1:35:15

Further, Time Search (through EC) behavior would be same as handled through RC, i. e. whenever

time search icon is required to be disabled on the menubar, time search request through EC would be ignored and it would result in an error message to EC.

Note 1: In following circumstances time search icon is disabled on the menubar (SW3.xx.xx behavior):

- Presence of any child menu (like FTS menu, user preference menu, etc.) of the menubar on the screen
- Active special modes like FTS ON, PBC ON for PSD discs, etc.

Note 2: if the time search window is present on the menu bar, time search request through EC would be ignored

Note 3: If the time search request can be handled through the menubar via RC, then time search request through EC would require a start of play as in time search through RC.

Note 4: On entry of any time value through EC command line, that's syntactically correct (in terms of commas, etc.), if the time value entered in the command line is not meaningful (for eg. time value happens to be greater than the duration of the disc), the request also would be ignored and it would result in an error message. However, the user would not be immediately prohibited from entering the time (as on the screen) in the command line that can't be played.

In all cases, where EC gets an error message, the type of error message would be in line with other error messages that EC gets on erroneous inputs.

EXTERNAL CONTROL STATUS

Player status

Message from external controller to DVD

group: PS
command: GetStatus

Message from DVD to external controller.

group: PS
command: GetStatus
parameter list: ReturnValue, Status

Status can have one of the following values:

0: Error
1: Opened
2: No Disc
3: Stopped
4: Playing
5: Paused

Example:

Request: [PS, GetStatus]\r
Response: [PS, GetStatus, 0, 4]\r

The player is in the “playing” state.

Disc type

Message from external controller to DVD

group: PS
command: GetDiscType

Message from DVD to external controller

group: PS
command: GetDiscType
parameter list: ReturnValue, DiscType

DiscType can have one of the following values

0: No disc
1: DVD
2: VCD or SVCD
3: CD-DA

Example:

Request: [PS, GetDiscType]\r
Response: [PS, GetDiscType, 0, 3]\r

There is a CD-DA disc in the tray

Note: When the player does not recognise the disc, asking the disc type will result in 0: No disc

Current audio stream

Message from external controller to DVD

group: PS
command: GetAST

Message from DVD to external controller

group: PS
command: GetAST
parameter list: ReturnValue, AudioStreamNumber

AudioStreamNumber: Number of the current audio stream.

Example:

Request: [PS, GetAST]\r
Response: [PS, GetAST, 0, 2]\r

The current audio stream is audio stream number 2.

Current sub-picture stream

Message from external controller to DVD

group: PS
command: GetSPST

Message from DVD to external controller

group: PS
command: GetSPST
parameter list: ReturnValue, SubPictureStreamNumber

SubPictureStreamNumber: Number of the current sub-picture stream.

Example:

Request: [PS, GetSPST]\r

Response: [PS, GetSPST, 0, 2]\r

The current sub-picture stream is sub-picture stream number 2.

Number of titles

Message from external controller to DVD

group: PS

command: GetNrT

Message from DVD to external controller

group: PS

command: GetNrT

parameter list: ReturnValue, NrTitles

NrTitles: Number of titles (DVD) or number of tracks (VCD, CD-DA) of the current disc.

Example:

Request: [PS, GetNrT]\r

Response: [PS, GetNrT, 0, 32]\r

The current disc contains 32 titles (DVD) or tracks (VCD, CD-DA).

Number of chapters

Message from external controller to DVD

group: PS

command: GetNrC

parameter list: TitleNr

TitleNr: Number of the title (DVD) or track (VCD).

Message from DVD to external controller

group: PS

command: GetNrC

parameter list: ReturnValue, NrChapters

NrChapters: Number of chapters (DVD) or entries (VCD) of the requested title or track.

Example:

Request: [PS, GetNrC, 2]\r

Response: [PS, GetNrC, 0, 13]\r

Title 2 contains 13 chapters (DVD) or track 2 contains 13 entries (VCD).

Current title

Message from external controller to DVD

group: PS

command: GetT

Message from DVD to external controller

group: PS

command: GetT

parameter list: ReturnValue, TitleNr

TitleNr: Number of the current title (DVD) or track (VCD, CD-DA).

Example:

Request: [PS, GetT]\r

Response: [PS, GetT, 0, 6]\r

The current title (DVD) or track is 6 (VCD, CD-DA).

Current chapter

Message from external controller to DVD

group: PS

command: GetC

Message from DVD to external controller

group: PS

command: GetC

parameter list: ReturnValue, TitleNr, ChapterNr

TitleNr: Title (DVD) or track (VCD) number of the current title or track

ChapterNr: Chapter (DVD) or entry (VCD) number of the current chapter or entry.

Example:

Request: [PS, GetC]\r

Response: [PS, GetC, 0, 1 7]\r

Current chapter is chapter 7 of title 1 (DVD) or the current entry is entry 7 of track 1 (VCD).

Disc ID (only for DVD)

Message from external controller to DVD

group: PS

command: GetDiscID

By player calculated string of 16 bytes. of currently inserted disc

Message from DVD to external controller

group: PS

command: GetDiscID

parameter list: ReturnValue, DiscID

DiscID: ID of the disc

Example:

Request: [PS, GetDiscID]\r

Response: [PS, GetDiscID, 0, Disc 123]\r

The ID of the current disc id "Disc 123"

Download data from DVD disc

Message from external controller to DVD

group: PS

command: GetSector

parameter list: SectorNr

SectorNr: Address of the sector to start downloading

Message from DVD to external controller

group: PS

command: GetSector

parameter list: ReturnValue, NumOfBytes

NumOfBytes: Number of bytes read from the disc <binary data>: Binary data from the DVD disc found at the specified sector.

Note: The binary data is not within the '[' and ']\r' pair.

Example:

Request: [PS, GetSector, 123456789]\r

Response: [PS, GetSector, 0, 2048]\r<binary data>

2048 Bytes of <binary data> is read from the DVD disc started from sector 123456789.

Note: The data is only sent in the case the ReturnValue is 0.

ASYNCHRONOUS RESPONSES

End of a title

Message from DVD to external controller

group: PR

command: EOT

parameter list: ReturnValue, TitleNr

TitleNr: Number of the title (DVD) or track (VCD, CDDA) of which the end is reached

Example: [PR, EOT, 3]\r

End of title 3 (DVD) or end of track 3 (VCD, CD-DA) is reached

Note: This message will be sent if a new title is started or if the disc is finished. It can not be guaranteed that no frames from the next title are played when the stop command is given immediately after the End of title message is received and the disc mode is DISC.

Start of a chapter

Message from DVD to external controller

group: PR
 command: SOC
 parameter list: ReturnValue, ChapterNr

ChapterNr: Number of the chapter of which playing is started.

Example: [PR, SOC, 0, 2]\r

Chapter 2 is started to be played.

End of a chapter

Message from DVD to external controller

group: PR
 command: EOC
 parameter list: ReturnValue, ChapterNr

ChapterNr: Number of the chapter of which the end is reached

Example: [PR, EOC, 2]\r

End of chapter 2 is reached

Note: This message will be sent if a new chapter is started or if the disc is finished. It can not be guaranteed that no frames from the next title are played when the stop command is given immediately after the End of chapter message is received and the disc mode is TITLE or DISC.

Execution of a command

Notification of a status changes:

Message from DVD to external controller

group: PR
 command: StatusChange
 parameter list: ReturnValue, ReturnStatus

Status can have one of the following values, and is only valid in the case no error has occurred:

0: Error
 1: Opened
 2: No Disc
 3: Stopped
 4: Playing
 5: Paused

Example: [PR, StatusChange, 5]\r

The player is in the pause state.

Note: The player distinguishes internally more detailed status information, e.g. search forward, search backward, slow forward, slow backward, menu, or setup. This data is not made available. When the player goes to a state which is not made available, no message is sent to the external controller.

Error notification

Notification of an error:

Message from DVD to external controller

group: PR
 command: Error
 parameter list: ReturnValue, Error code

A list with error codes is appended

Example: [PR, Error, 4]\r

A command is send to the player which caused an error. Error code 4 identifies the occurred error.

TRADE MODE

The DVD 175 player can be brought into a “Trade Lock” mode by pushing two player control buttons (less than 2 seconds) on the front while switching on the player.

These buttons are:

“OPEN/CLOSE button + PREV button.

After this has been done the player will act as below:

- Auto play at power on. (All playable formats)
- After end of title automatic “Repeat” function.
- All control buttons are disabled on the player front.
- All remote control buttons remain operational.
Disc change can still be done by pushing the STOP button on the remote control till the tray opens.

The player can be “Delocked” by pushing two player control buttons on the front (OPEN/ CLOSE button and PREV button) less than 2 seconds while swithching on the player.

Remark:

To check in what “mode” the player is the user only has to check the functionality of the “Open/ Close” button.

Special Mode Entries:

To enter into special modes like PAL ↔ NTSC, VIRGIN Mode, TRADE Mode, DIAGNOSTIC Mode, DLA Mode, key1 and key 2 with power on has to be used. The key combinations are listed in the Table 1.

| SL.No | Action | Key 1 | key 2 |
|-------|----------------------|-------|-------|
| 1 | PAL + NTSC switching | STOP | NEXT |
| 2 | VIRGIN Mode | OPEN | PLAY |
| 3 | TRADE Mode | OPEN | PREV |
| 4 | DIAGNOSTIC Mode | OPEN | PAUSE |
| 5 | DLA Mode | STOP | PLAY |
| 6 | Service Mode | OPEN | STOP |

Table 1 LK Special mode key Map

NAVIGATION AND HANDLING NON VOLATILE MEMORY

The ProDVD 175 professional DVD-Video player is equipped with NVRAM (Non Volatile Random Access Memory) for saving application data. The data written to the NVRAM will be available every time the application is played or can be used to transfer data from one disc-application to another disc-application.

The DVD application will be able to set, update and react on the contents of this non-volatile data. This data can be retrieved through the players’ RS232 interface for data processing or statistical analysis.

A few examples of what you can do with NVRAM are:

- Playlist: Create your own selection of video sequences and automatically play this selection every time you power on the player.
- Let the user take a test and save the results of the test for later (protected) reviews by the manager.
- Allow certain ProDVD 175 players to play specific video fragments while other ProDVD 175 players will not play these video fragments, using the same disc.
- Store visitors’ statistics: how many times have people made specific selections at the kiosk?

NVRAM manual

More information about what you can do with the NVRAM functionality and how it can be used can be found in the special NVRAM manual.

ERROR CODES

| Name | Code | Description |
|---------------------------------|------|---|
| ecEXT_ERR_OK | 0 | No error |
| ecEXT_ERR_UNKNOWN | 1 | Cause of error not known |
| ecEXT_ERR_INVALID_PARAM | 2 | Invalid parameter |
| ecEXT_ERR_INV_BUF_SIZE | 3 | Message exceeds buffer size |
| ecEXT_ERR_INV_MSG | 4 | Message syntax not valid |
| ecEXT_ERR_INV_CMD | 5 | Command not valid |
| ecEXT_ERR_COMM_ERROR | 6 | Communication error |
| ecEXT_ERR_FLOW_OFF | 7 | No more commands can be sent |
| ecEXT_ERR_FLOW_ON | 8 | Commands can be sent again |
| ecEXT_ERR_UOP_ERROR | 9 | Command not executed due to UOP |
| ecEXT_ERR_INVALID_NA_DISC_ERROR | 10 | Command not valid for current disc |
| ecEXT_ERR_DISC_ERROR | 11 | Disc read error |
| ecEXT_ERR_DIRTY_DISC_ERROR | 12 | Disc error due to dirty disc |
| ecEXT_ERR_INVALID_COMMAND_STATE | 13 | Command not allowed in this state of the player |
| ecEXT_ERR_NO_GPRM_AVAILABLE | 14 | Requested GPRMs not available |
| ecEXT_ERR_CMD_NOT_ALLOWED | 15 | Command to deliver binary data not |

ROM CODE TABLE RANGE

| No | KEYS | CODE | Supported by RCC | EC | MDV |
|-----|--------------------------------|---------|------------------------|-----|-----|
| 1. | Open/Close | 004:066 | X | X | X |
| 2. | Play | 004:044 | X | X | X |
| 3. | Stop | 004:049 | X | X | X |
| 4. | Next | 004:032 | X | X | X |
| 5. | Prev | 004:033 | X | X | X |
| 6. | Pause/Step | 004:048 | X | X | X |
| 7. | Cursor Up | 004:088 | X | X | |
| 8. | Cursor Down | 004:089 | X | X | |
| 9. | Cursor Left | 004:090 | X | X | |
| 10. | Cursor Right | 004:091 | X | X | |
| 11. | OK (enter) | 004:092 | X | X | X |
| 12. | System (Menu) | 004:130 | X | X | |
| 13. | Disc (Menu) | 004:084 | X | X | X |
| 14. | Title Menu | 004:113 | X | X | |
| 15. | Key Menu | 004:209 | X | X | |
| 16. | OSD On/Off | 004:015 | X | X | |
| 17. | Key Access | 004:235 | X | | |
| 18. | Return | 004:131 | X | X | X |
| 19. | Display (Bit Rate/ CD Text) | 004:239 | X | N/A | N/A |
| 20. | Resume | 004:215 | X | X | |
| 21. | Title | 004:201 | X | | |
| 22. | Chapter | 004:202 | X | | |
| 23. | FTS | 004:251 | X | X | |
| 24. | TimeSearch | 004:242 | X | | |
| 25. | Memory | 004:069 | X | N/A | |
| 26. | Disc Lock | 004:243 | X | N/A | |
| 27. | T/C | 004:200 | X | X | |
| 28. | TV/DVD | 004:067 | X | X | X |
| 29. | Aspect Ratio | 004:249 | X | N/A | N/A |
| 30. | Option | 004:250 | X | N/A | N/A |
| 31. | PBC On/Off | 004:214 | X | | |
| 32. | Display Dim | 004:019 | X | | |
| 33. | Standby (Power) | 004:012 | X | X | X |
| 34. | Digit 1 | 004:001 | X | X | X |
| 35. | Digit 2 | 004:002 | X | X | X |

| | | | | | |
|-----|-------------------|---------|---|-----|---|
| 36. | Digit 3 | 004:003 | X | X | X |
| 37. | Digit 4 | 004:004 | X | X | X |
| 38. | Digit 5 | 004:005 | X | X | X |
| 39. | Digit 6 | 004:006 | X | X | X |
| 40. | Digit 7 | 004:007 | X | X | X |
| 41. | Digit 8 | 004:008 | X | X | X |
| 42. | Digit 9 | 004:009 | X | X | X |
| 43. | Digit 0 | 004:000 | X | X | X |
| 44. | Angle | 004:133 | X | X | X |
| 45. | Subtitle | 004:075 | X | X | |
| 46. | Subtitle On/Off | 004:227 | X | X | |
| 47. | Audio | 004:078 | X | X | X |
| 48. | Repeat | 004:029 | X | X | X |
| 49. | Repeat A-B | 004:059 | X | X | |
| 50. | Shuffle | 004:028 | X | X | |
| 51. | 3D Sound | 004:082 | X | N/A | |
| 52. | Scan | 004:042 | X | X | |
| 53. | Zoom | 004:247 | X | N/A | |
| 54. | Forward | 004:040 | X | X | X |
| 55. | Forward 4x | 004:223 | X | X | |
| 56. | Forward 8x | 004:224 | X | X | X |
| 57. | Backward | 004:041 | X | X | X |
| 58. | Backward 4x | 004:222 | X | X | |
| 59. | Backward 8x | 004:221 | X | X | X |
| 60. | Slow Forward ½ | 004:034 | X | X | |
| 61. | Slow Forward 1/8 | 004:216 | X | X | X |
| 62. | Slow Backward ½ | 004:035 | X | X | |
| 63. | Slow Backward 1/8 | 004:219 | X | X | X |
| 64. | Step Forward | 004:246 | X | X | |
| 65. | Step Backward | 004:245 | X | X | |
| 66. | Playback Reverse | 004:045 | X | X | |
| 67. | Karaoke On/Off | 004:228 | X | N/A | |
| 68. | Karaoke Key + | 004:236 | X | N/A | |
| 69. | Karaoke Key - | 004:237 | X | N/A | |
| 70. | Echo + | 004:233 | X | N/A | |
| 71. | Echo - | 004:234 | X | N/A | |
| 72. | Vocal | 004:231 | X | N/A | |
| 73. | Once More | 004:229 | X | N/A | |

Note: RC key codes for Display (Bit rate/CD Text), PBC On/Off, Display Dim will not be supported through EC. (RCC = Remote Control Command, EC = External Control).

OVERVIEW OF COMMANDS

Overview external control commands (group PC)

| command | parameter-list |
|---------------|------------------------|
| RC | RCCode |
| PlayT | TitleNumber |
| PlayC | TitleNumber, |
| ChapterNumber | |
| OSD | Mode |
| LKC | Mode |
| RCC | Mode |
| UOP | Mode |
| SetAST | AudioStreamNumber |
| SetSPST | SubPictureStreamNumber |
| CDDALock | Lock |
| PVRLock | Lock, ProviderID |
| SetPlayMode | CHAPTER TITLE DISC |

Overview asynchronous response (group PR)

| command | parameter-list |
|--------------|------------------------|
| EOT | ReturnValue, TitleNr |
| EOC | ReturnValue, ChapterNr |
| StatusChange | ReturnValue, Status |
| Error | ReturnValue, ErrorNr |

Overview external control status (group PS)

| command | parameter-list request | parameter-list response | binary |
|-----------------|-------------------------------------|-------------------------|--------|
| data | | | |
| GetStatus | ReturnValue, Status | - | |
| GetDiscType | ReturnValue, DiscType | - | |
| GetAST | ReturnValue, AudioStreamNumber | - | |
| GetSPST | ReturnValue, SubPictureStreamNumber | - | |
| GetNrT | ReturnValue, NrTitles | - | |
| GetNrC | TitleNr | ReturnValue, NrChapters | - |
| GetT | ReturnValue, TitleNr | - | |
| GetC | ReturnValue, TitleNr, ChapterNr | - | |
| GetDiscID | ReturnValue, DiscID | - | |
| GetSector | SectorNr | ReturnValue, NumBytes | Yes |
| GetCyclicBuffer | ReturnValue, NumBytes | | Yes |

Note: In case binary data is “Yes”, the Binary data will be send immediately after the ASCII parameter list response. It will only be send in case Return Value = 0.